Claims

The following listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1.   **(Previously Presented)** A system for sorting multicellular organisms comprising:

a population of multicellular organisms comprising a plurality of spatially distinct, optically detectable, phenotypic characteristics; and

an instrument for detecting the location of the spatially distinct, optically detectable, phenotypic characteristic on the multicellular organism and for orienting the multicellular organism along its longitudinal axis.

2.   **(Previously Presented)** The system of claim 1, wherein the spatially distinct, optically detectable, phenotypic characteristics comprise:

a marker pattern, the marker pattern including a plurality of spatially consistent first features spaced apart along a length of each organism;

and at least one second feature modifiable or inducible when the population is subjected to a test treatment.

3.   **(Original)** The system of claim 1, wherein the instrument is a flow cytometer equipped to process elongate multicellular organisms.

4.   **(Previously Presented)** The system of claim 1, wherein the instrument measures a gating signal for detecting the spatially distinct, optically detectable, phenotypic characteristic over background signals.

5.   **(Previously Presented)** The system of claim 4, wherein the gating signal comprises light scattered in the forward direction.

6.   **(Previously Presented)** The system of claim 4, wherein the gating signal comprises light

attenuated by the organism in the forward direction.

7.   (Original) The system of claim 1, wherein the instrument further comprises:

a source containing multicellular organisms in a fluid suspension;

means for causing the fluid suspension to move in a direction of flow;

means for aligning the elongate multicellular organisms relative to the direction of flow;

a light source for producing an optical beam through which the elongate multicellular organisms pass after becoming aligned;

a first optical detector for detecting light over a solid angle of at least 20 degrees and over a collection angle of approximately 0.0 to 6.0 degrees in the horizontal axis and approximately 17 degrees in the vertical axis, for detecting passage of said organisms through said optical beam; and

a fluid switch downstream of a point where said organisms pass through said optical beam, said switch responsive to the first optical detector to allow detected objects to pass to a sample container.

8.   (Original) The system of claim 7, further comprising additional optical detectors for detecting sequential optical characteristics arrayed along a length of the multicellular organism wherein outputs of said detectors are gated by an output of the first optical detector to produce gated outputs.

9.   (Original) The system of claim 8, further comprising a data representation of the sequential optical characteristics comprised of the outputs of the additional optical detectors.

10.   (Original) The system of claim 9, further comprising a controller connected to the fluid switch and operative to cause said switch to select multicellular organisms showing data representations meeting predetermined criteria.

11.   (Original) A method for sorting multicellular organisms comprising the steps of:

providing a population of test organisms, wherein each member of the population displays at least one spatially distinct, optically detectable, phenotypic characteristic;

analyzing the arrangement of spatially distinct, optically detectable, phenotypic characteristics of each population member; and

depositing members of the population based on the arrangement of spatially distinct, optically detectable, phenotypic characteristics.

12. **(Currently Amended)** The method of claim 11, wherein the spatially distinct, optically detectable, phenotypic characteristics comprise:

a marker pattern, the marker pattern including a plurality of spatially consistent first features spaced apart along a length of each organism;

and at least one second feature modifiable or inducible when the population is subjected to a test treatment.

13. **(Original)** The method of claim 12, wherein the organisms are selected based on the location of the second feature with respect to the first features along the length of each organism.

14. **(Original)** The method of claim 12, wherein the organisms are deposited based on the location of the second feature with respect to the first features along the length of each organism.

15-47. **(Canceled)**